IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appl. No. : 10/526,924
Appellant(s) : MARRA, Johannes, et al.
Filed : 8 March 2005
Title : LIGHTING DEVICE

TC/A.U. : 2885

Conf. No. : 7552

Examiner : REHM, Adam C.

Atty. Docket : NL 020878

APPELLANT'S APPEAL BRIEF

Board of Patent Appeals and Interferences
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Brief of Appellant follows a Notice of Appeal dated 28 February 2007, appealing the decision dated 13 December 2006 of the Examiner finally rejecting claims 1-10 and 12-19 of the application.

All requisite fees set forth in 37 CFR 1.17(c) for this Brief are hereby authorized to be charged to Deposit Account No. 14-1270.

REAL PARTY IN INTEREST

The real party in interest in this appeal is the assignee of all rights in and to the subject application, Koninklijke Philips Electronics, N.V. of The Netherlands.

RELATED APPEALS AND INTERFERENCES

To the best of the knowledge of the undersigned, no other appeals or interferences are known to Appellants, Appellants' legal representatives, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Of the originally filed claims 1-15, claims 4 and 6-13 were preliminarily amended to delete multiple dependencies, and subsequently by amended dated 3 October 2006, claims 1, 3, 5, 6 and 15 were variously amended, claim 11 was cancelled and claims 16-19 were added. Claims 1-10 and 12-19 stand finally rejected and are the subject of this appeal.

STATUS OF AMENDMENTS

No amendments were presented in response to the Final Office action of 13 December 2006. All amendments have been entered.

SUMMARY OF THE CLAIMED SUBJECT MATTER

In accordance with a first aspect of the invention, a lighting device (1) comprising at least one light source (3, 10) as well as a light reflector (4) disposed beside the light source (3, 10) for reflection of at least part of the light radiated from the light source (3, 10), characterized in that the light reflector (4) comprises at least one light-transmitting element (4, 12) bounding a space (5, 13) at least in part, as well as a diffusely reflective 'free flowing' powder (6, 14) present inside said space (5, 13). (specification, page 1, lines 1-4; page 2, line 31 through page 3, line 1; figs. 1 and 2; claim 1)

According to one embodiment of this aspect of the invention, the powder (6, 14) comprises calcium halophosphate, calcium pyrophosphate, $BaSO_4$, MgO, YbO_3, TiO_2 or Al_2O_3 particles. (specification, page 3, lines 1 and 2; figs. 1 and 2; claim 2)

Preferably, the particles have an average diameter ranging between 0.1 and 100 μm, more preferably between 5 and 20 μm. (specification, page 3, line 14; claims 3 and 16).

According to another embodiment of this aspect of the invention, the particles are mixed with fine-grained Al_2O_3 particles having an average diameter which ranges between 10 and 50 nm. (specification, page 3, lines 15 and 16; claim 4).

Preferably, the fine-grained Al_2O_3 particles have an average diameter ranging between 10 and 50 nm, more preferably between 10 and 50 nm, and the amount ranges between 0.1 and 5 wt. %.17, more preferably between 0.5 and 3 wt.%. (specification, page 3, lines 16-18; claims 5 and 17)

Preferably, the space (5, 13) has a thickness greater

than or equal to 0.5 mm., more preferably greater than or equal to 1 mm., most preferably greater than or equal to 2 mm. (specification, page 3, lines 19-21; claims 6, 18 and 19)

According to another embodiment of this aspect of the invention, the light-transmitting element (4, 12) is a plate of glass or a synthetic material. (specification, page 3, lines 25 and 26; figs. 1 and 2; claim 7)

Preferably, the space (5, 13) is bounded, at least in part, by the light-transmitting element (4, 12) and by another light-transmitting element. (specification, page 3, lines 27 and 28; figs. 1 and 2; claims 8 and 9)

According to another embodiment of this aspect of the invention, the powder is mixed with colour pigments. (specification, page 4, lines 1 and 2; claim 10).

Preferably, the powder is incapable of absorbing light, at least light having a wavelength in the visible range. (specification, page 4, lines 3-5; claim 12)

Preferably, a surface of the light-transmitting element (4, 12) facing towards the light source is optically roughened. (specification, page 4, lines 8-10; claim 13)

Preferably, a surface of the light-transmitting element (4, 12) facing towards the powder is likewise optically roughened. (specification, page 4, lines 10 and 11; claim 14)

According to a second aspect of the invention, there is provided a method for manufacturing a lighting device (1), in which at least one light source (3, 10) and at least one lighting fixture (2) having a surface facing the light source (3, 10) are supplied and in which a light reflector (4, 12) is arranged beside the light source (3, 10) for diffuse reflection of at least part of the light radiated from the light source (3, 10) and for specular reflection of at least another part of

the light radiated from the light source (3, 10) so as to increase light output of the lighting device (1) and to restrict the angular distribution of the intensity of the emitted light beam from the lighting device (1), characterized in that at least one light-transmitting element (4, 12) bounding a space (5, 13) at least in part, as well as a diffusely reflective 'free flowing' powder (6, 14) present inside said space (5, 13) are used as the light reflector, wherein the light-transmitting element (4, 12) comprises at least two substantially parallel, substantially optically smooth surfaces, a first surface facing towards the light source (3, 10) and a second surface facing towards the lighting fixture (2), and wherein the surface of the light-transmitting element (4, 12) that faces towards the light source (3, 10) extends substantially parallel to the surface of the lighting fixture (2) facing the light source (3, 10). (specification, page 4, lines 13-24; figs. 1 and 2; claim 15)

GROUND(S) OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are:

1. claims 1, 7-10, 12 and 13 are rejected under 35 USC 102(b) as being anticipated by Mabe et al. (U.S. patent 6,568,840) (herein 'Mabe');

2. claims 2-5 are rejected under 35 USC 103(a) as being unpatentable over Mabe in view of Ono (U.S. patent 6,830,354);

3. claim 6 is rejected under 35 USC 103(a) as being unpatentable over Mabe;

4. claim 14 is rejected under 35 USC 103(a) as being unpatentable over Mabe; and

5. claim 15 is rejected under 35 USC 103(a) as being unpatentable over Mabe.

ARGUMENT

1. Are claims 1, 7-10, 12 and 13 anticipated under 35 USC 102(b) by Mabe?

Claims 1, 7-10, 12 and 13 are rejected under 35 USC 102(b) as being anticipated by Mabe.

Mabe discloses a vehicle lamp including a lamp body 3 and lens 2 which together form an integral optically transparent housing, a light source 15 inside the housing, and a reflection layer 10 on the outside surface 301 of the lamp body 3.

Figs. 3-(B), 4-(A) and 4-(B) of the reference show the reflection layer 10 is formed from aluminum particles suspended in an oil varnish (102, 112, 122), with the aluminum particles in the form of flakes adhered to the surface 301 of the body 3 (Fig. 3-(B), adhered to the outer protective layer 13 (Fig. 4-(A), and dispersed throughout the oil varnish layer (Fig. 4-(B). In each case, the aluminum particles are fixed in place by the oil varnish layer, and the oil varnish layer completely fills the space between the body 3 and the protective layer 13.

In contrast to the teachings of Mabe, Appellant's claim 1 calls for the diffusely reflecting powder in the space to be 'free flowing', which makes clear that Appellant's powder is not trapped inside a matrix (such as the oil varnish of

Mabe), but is free flowing inside the space formed by the light-transmitting element.

In response to Appellant's argument that the phrase 'free flowing' in claim 1 makes clear that Appellant's diffusely reflecting powder is not trapped inside a matrix (such as the oil varnish of Mabe), but is free flowing inside the space formed by the light-transmitting element, the Examiner has responded that a reasonable interpretation of the added phrase is that the powder is free flowing prior to adhesion to a varnish layer, and that the Examiner has been unable to find any language in the specification to support a different interpretation, e.g., that the powder retains its free flowing character after manufacture.

Appellant's specification states that it is known to provide a surface of a lighting fixture with a white, smooth coating consisting of white, light-scattering particles, which are present in a binder matrix and which are bonded to the surface of the lighting fixture therewith. See page 2, lines 12-15.

Appellant's specification further states that there are drawbacks to this coating, one being the use of organic solvents, and another being that the application of the coating is time-consuming, because relatively thick coating layers are required which need to be dried carefully. Furthermore, the coating is usually not capable of withstanding the high operating temperatures of the lighting device. See page 2, lines 22-26.

The specification then states that the object of the invention is to overcome these drawbacks, by providing a lighting device with a light reflector comprising a light-transmitting element bounding a space, and a diffusely

reflective, free flowing powder inside this space. See specification, page 2, line 30 through page 3, line 1.

This language makes clear that Appellant's solution to the stated problems of the coating of powder particles of the prior art is to replace such a coating with a light-transmitting space containing a free flowing reflective powder.

Moreover, there is no language in the specification which contradicts this clear language. There is no mention of coatings or binders of any sort with respect to the free flowing powder.

Thus, the contention that Appellant's powder is no longer free flowing after manufacture has no support in the specification. On the contrary, the specification makes clear that the powder remains free flowing after manufacture. In such form, it is able to overcome the disadvantages of the particle/binder coatings of the prior art.

In the Advisory Action of 8 February 2007, the Examiner has stated that Appellant's claim language does not distinctly claim that the free-flowing powder retains its free-flowing nature after manufacture, so that it is reasonable to assert that Appellant's powder is set in a varnish.

Appellant's claim language is exemplified by claim 1, which claims, *inter alia*, a lighting device comprising a light reflector comprising a space and 'free flowing' powder present inside said space. Thus, Appellant's language is clear in its meaning. The lighting device has a space containing free flowing powder. If a varnish were present in the space to bind the powder particles together, then the powder would not be free flowing. According to both the claims and the specification, which supports the claims, the device contains free flowing powder. Nothing in the specification or claims

indicates otherwise, and to assume otherwise is to distort their clear and unambiguous meaning.

Accordingly, claims 1, 7-10, 12 and 13 are not anticipated by Mabe, and the rejection is in error and should be reversed.

2. Are claims 2-5 unpatentable under 35 USC 103(a) over Mabe in view of Ono?

Claims 2-5 are rejected under 35 USC 103(a) as being unpatentable over Mabe in view of Ono.

Ono discloses an aperture fluorescent lamp having a glass tube 1, a UV-reflective layer 2 on the inner surface of the glass tube 1, and a phosphor layer 3 on the UV reflective layer 2. See, e.g., Figs. 1A, 3A and 3B.

The UV-reflective layer 2 is made of metal oxide powder, such as aluminum oxide and zirconium oxide. Col. 10, lines 29-31. While Ono does not describe the method of formation of this layer 2, it is readily apparent from the drawings, e.g., Fig. 3B, that the layer 2 is rigidly adherent to the inner surface of the glass tube 1, because it remains intact after the removal of a portion of the phosphor layer 3 in order to form the aperture 14. Thus, Ono's layer 2 is not made of free-flowing powder in a space.

Moreover, neither Mabe nor Ono teaches or suggests that their reflective layers contain any particles of calcium halophosphate, calcium pyrophosphate, $BaSO_4$, MgO, YbO_3 or TiO_2 (claim 2), or that the particles have an average diameter ranging between 0.1 and 100 μm (claim 3), or that the particles are mixed with fine-grained Al_2O_3 particles having an average diameter which ranges between 10 and 50 nm (claim 4), or that the amount of fine-grained Al_2O_3 particles ranges between 0.1 and 5 wt. % (claim 5).

Such materials, particle sizes and amounts could only have been arrived at with the aid of hindsight from Appellant's own teachings, which is not permitted in judging obviousness under Section 103.

In response to Appellant's argument that neither Mabe nor Ono teaches or suggests that their reflective layers contain any particles of calcium halophosphate, calcium pyrophosphate, $BaSO_4$, MgO, YbO_3 or TiO_2 (claim 2), or that the particles have an average diameter ranging between 0.1 and 100 µm (claim 3), or that the particles are mixed with fine-grained Al_2O_3 particles having an average diameter which ranges between 10 and 50 nm (claim 4), or that the amount of fine-grained Al_2O_3 particles ranges between 0.1 and 5 wt. % (claim 5), and that such materials, particle sizes and amounts could only have been arrived with the aid of hindsight from Appellant's own teachings, which is not permitted in judging obviousness under Section 103, the Examiner has responded that it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use.

However, neither Mabe nor Ono teach that any of the disclosed materials are suitable for use in a reflective layer, and the Examiner has provided no other reference to establish the suitability of such materials for the intended use.

The Examiner has stated that Ono teaches the use of Al_2O_3 'as provided above'.

However, Ono does not teach that particles of calcium halophosphate, calcium pyrophosphate, $BaSO_4$, MgO, YbO_3 or TiO_2 having an average diameter ranging between 0.1 and 100 µm are mixed with fine-grained Al_2O_3 particles having an average diameter which ranges between 10 and 50 nm, or that the amount

of fine-grained Al_2O_3 particles ranges between 0.1 and 5 wt.%, as claimed by Appellant.

Thus, Ono does not teach the use of Al_2O_3 'as provided above'.

Regarding Appellant's argument that neither Mabe nor Ono teaches or suggests that the particles have an average diameter ranging between 0.1 and 100 μm (claim 3), or that the particles are mixed with fine-grained Al_2O_3 particles having an average diameter which ranges between 10 and 50 nm (claim 4), the Examiner has responded that determining size is generally recognized as being within the level of ordinary skill in the art, and that discovering an optimum value of a result effective variable involves only routine skill in the art.

In *Ex parte Hartmann et al.*, USPTO Board of Patent Appeals and Interferences, Appeal No. 2004-1092, http://www.uspto.gov/go/dcom/bpai/decisions/fd041092.pdf, it was observed that one of ordinary skill in the art would recognize that catalyst size is a result effective variable because the prior art teaches that a smaller size non-porous catalyst would be expected to have a larger surface area available for furnishing catalyzed reaction sites. Consequently, one of ordinary skill in the art would have been led to the claimed catalyst sizes upon routine experimentation. (page 6).

However, *Ex parte Hartmann et al.* does not apply to the instant rejection, since there is nothing in Mabe or Ono to indicate any relationship between particle size of a free flowing powder and reflectivity or any other property, because neither Mabe nor Ono were concerned with the use of free flowing powder.

Thus, the particle size of Appellant's free flowing

reflective powder is not a result effective variable, but the result of inventive effort.

In the Advisory Action dated 8 February 2007, the Examiner stated that since claim 2 claims the compounds in the alternative, Ono need only teach a single compound, which it does, i.e., Al_2O_3.

The Examiner does not explain how the disclosure of Al_2O_3 could suggest use of the other compounds claimed by Appellant. The claimed compounds have no well-known chemical similarity which would allow an assumption of equivalency. For example, the compounds are not all from the same group or even adjacent groups of the Periodic Table.

Indeed, the grouping of compounds claimed by Appellant would appear to be arbitrary. It is only with the aid of hindsight from Appellant's own teachings that these compounds can be viewed as equivalent, and then only for the limited purpose of the present application. Of course, such hindsight is not permitted in judging obviousness under Section 103.

Also in the Advisory Action, in response to Appellant's argument that Ono does not teach mixing fine-grained Al_2O_3 particles having an average diameter which ranges between 10 and 50 nm with one of the compounds of claim 2, as called for by claim 4, the Examiner has stated that Ono would inevitably mix Al_2O_3 particles with other Al_2O_3 particles upon manufacture.

This argument ignores the limitation 'fine-grained Al_2O_3 particles having an average diameter which ranges between 10 and 50 nm'. Ono does not teach mixing such fine-grained Al_2O_3 particles with other Al_2O_3 particles upon manufacture.

Finally, the Examiner has stated in the Advisory

Action that it is notoriously known that a larger reflector reflects more light than a smaller reflector, and that since the prior art discloses reflective particles, merely claiming a specific particle size in order to obtain the obvious result is not inventive.

However, the prior art does not disclose reflective particles, but rather discloses reflective coatings. Moreover, if a larger reflector reflects more light than a smaller one, then would not the 'obvious result' be to claim the largest possible particle sizes without regard for flowability, compaction, available space and a myriad of other factors?

In contrast to this simplistic approach, Appellant has claimed ranges of particle sizes which have upper and lower limits which are not obvious to anyone who has not used free flowing particles as a reflective medium, and neither Mabe nor Ono teaches this use.

Accordingly, claims 2-5 are patentable over the combination of Mabe and Ono, and the rejection is in error and should be reversed.

3. Is claim 6 unpatentable under 35 USC 103(a) over Mabe?

Claim 6 is rejected under 35 USC 103(a) as being unpatentable over Mabe. Claim 6, which is dependent on claim 1, is patentable for the reason that Mabe does not teach or suggest that his reflective layer is composed of free flowing powder. Accordingly, claims 6 is patentable over Mabe, and the rejection should be reversed.

4. Is claim 14 unpatentable under 35 USC 103(a) over Mabe?

Claims 14 is rejected under 35 USC 103(a) as being unpatentable over Mabe. Claim 14, which is indirectly dependent

on claim 1, is patentable for the reason that Mabe does not teach or suggest that his reflective layer is composed of free flowing powder. Accordingly, claim 14 is patentable over Mabe, and the rejection should be reversed.

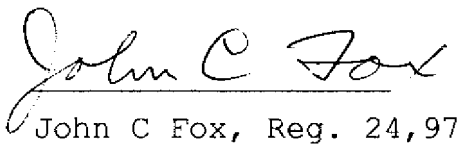
5. Is claim 15 unpatentable under 35 USC 103(a) over Mabe?

Claim 15 is rejected under 35 USC 103(a) as being unpatentable over Mabe. Claim 15 specifies that the powder is 'free flowing'. Thus, claim 15 is patentable for the reason that Mabe does not teach or suggest that his reflective layer is composed of free flowing powder. Accordingly, claim 15 is patentable over Mabe, and the rejection should be reversed.

CONCLUSION

In view of the foregoing, Appellant respectfully requests that the Board reverse the rejections of record, and direct the Examiner to allow all of the pending claims, and to otherwise find the application to be in condition for allowance.

Respectfully submitted,



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APPENDIX

CLAIMS ON APPEAL

1. A lighting device comprising at least one light source as well as a light reflector disposed beside the light source for reflection of at least part of the light radiated from the light source, characterized in that the light reflector comprises at least one light-transmitting element bounding a space at least in part, as well as a diffusely reflective 'free flowing' powder present inside said space.

2. A lighting device according to claim 1, wherein said powder comprises calcium halophosphate, calcium pyrophosphate, $BaSO_4$, MgO, YbO_3, TiO_2 or Al_2O_3 particles.

3. A lighting device according to claim 2, wherein the particles have an average diameter ranging between 0.1 and 100 μm.

4. A lighting device according to claim 2, wherein said particles are mixed with fine-grained Al_2O_3 particles having an average diameter which ranges between 10 and 50 nm.

5. A lighting device according to claim 4, wherein the amount of fine-grained Al_2O_3 particles having an average diameter ranging between 10 and 50 nm ranges between 0.1 and 5 wt. %.

6. A lighting device according to claim 1, wherein said space has a thickness greater than or equal to 0.5 mm.

7. A lighting device according to claim 1, wherein the light-transmitting element is a plate of glass or a synthetic material.

8. A lighting device according to claim 1, wherein said space is bounded, at least in part, by said light-transmitting element and by another light-transmitting element.

9. A lighting device according to claim 1, wherein said space is bounded, at least in part, by said light-transmitting element and by another light-transmitting element.

10. A lighting device according to claim 1, wherein said powder is mixed with colour pigments.

12. A lighting device according to claim 1, wherein the powder is incapable of absorbing light, at least light having a wavelength in the visible range.

13. A lighting device according to claim 1, wherein a surface of the light-transmitting element
facing towards the light source is optically roughened.

14. A lighting device according to claim 13, wherein a surface of the light-transmitting element
facing towards the powder is likewise optically roughened.

15. A method for manufacturing a lighting device, in which at least one light source and at least one lighting fixture having a surface facing the light source are supplied and in which a light reflector is arranged beside the light source for diffuse

reflection of at least part of the light radiated from the light source and for specular reflection of at least another part of the light radiated from the light source so as to increase light output of the lighting device and to restrict the angular distribution of the intensity of the emitted light beam from the lighting device, characterized in that at least one light-transmitting element bounding a space at least in part, as well as a diffusely reflective 'free flowing' powder present inside said space are used as the light reflector, wherein the light-transmitting element comprises at least two substantially parallel, substantially optically smooth surfaces, a first surface facing towards the light source and a second surface facing towards the lighting fixture, and wherein the surface of the light-transmitting element that faces towards the light source extends substantially parallel to the surface of the lighting fixture facing the light source.

16. A lighting device according to claim 3, wherein the particles have an average diameter ranging between 5 and 20 μm.

17. A lighting device according to claim 5, wherein the amount of fine-grained Al_2O_3 particles having an average diameter ranging between 10 and 50 nm ranges between 0.5 and 3 wt.%.

18. A lighting device according to claim 6, wherein said space has a thickness greater than or equal to 1 mm.

19. A lighting device according to claim 18, wherein said space has a thickness greater than or equal to 2 mm.

EVIDENCE APPENDIX

(none)

RELATED PROCEEDINGS APPENDIX

(none)